

REMARKS

Favorable reconsideration of this application is respectfully requested in view of the foregoing amendments and the following remarks.

Claims 5-11, 14-27 and 30-33 have been cancelled without prejudice or disclaimer of the subject matter contained therein. Claims 35 and 36 have been added. Thus, claims 1-4, 12, 13, 28, 29 and 34-36 are pending in the present application, of which claims 1-4 are independent.

Noted – Priority Documents Received By USPTO

The indication (see present Office Action Summary, box 12(a)(1) as checked) that the certified copies of the priority documents have been received by the USPTO is noted with appreciation.

Claim Rejections Under 35 U.S.C. §112

Claims 1-4, 12, 13, 28, 29 and 34 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the written description requirement.

The Office Action alleges that the original disclosure does not include teaching “while only a polishing slurry is supplied onto the polishing pad....”

As an example, “while only a polishing slurry is supplied onto the polishing pad....” is supported by page 42, line 4 to page 44, line 17 of the specification. Although the polishing slurry and water are written as matters supplied onto the polishing pad in an explanation part regarding further polishing a surface of a film-to-be-polished (page 44, line 25 to page 46, line 18

of the specification), nothing is written in an explanation part regarding polishing the surface of the film-to-be-polished to planarize the surface of the film-to-be-polished (page 42, line 4 to page 44, line 17) other than the polishing slurry as a matter supplied onto the polishing pad. It is clear from this that water is not supplied onto the polishing pad in the polishing the surface of the film-to-be-polished to planarize the surface of the film-to-be-polished, and only the polishing slurry is supplied onto the polishing pad in the polishing the surface of the film-to-be-polished to planarize the surface of the film-to-be-polished.

Therefore, the original disclosure includes teaching “while only a polishing slurry is supplied onto the polishing pad....”

Accordingly, withdrawal of the rejection is respectfully requested.

Claim Rejections Under 35 U.S.C. §102

Claims 1-3, 12, 13, 28 and 29 are rejected under 35 U.S.C. §102(e) as being anticipated by Zagrebelny (U.S. Patent No. 6,863,595).

INDEPENDENT CLAIMS 1 AND 3

As an example, independent claims 1 and 3 recite (among other things) a feature of “in the further polishing the surface of the film-to-be-polished, said polishing slurry is supplied onto the polishing pad through a nozzle, and said water is supplied onto the polishing pad through another nozzle” (Underlining is added for emphasis). As will be explained below, at least this feature of claims 1 and 3 is a distinction over Zagrebelny.

The Office Action alleges that Zagrebelyn teaches “further polishing the surface of the film-to-be-polished with the polishing pad while polishing slurry and water are supplied onto the polishing pad (final polishing step with residual slurry particles 158 present on surface 156; fig. 7 and col. 14, lines 33-50).”

Zagrebelyn states at col. 14, lines 33-50:

“In an embodiment, if the polishing described above is a primary polishing step, semiconductor topography 154 may be transferred to a final polishing step with residual slurry particles 158 present on the topography. As such, a pH transition does not take place on the primary polishing pad during the primary polishing step. In an alternative embodiment, if the polishing described above is substantially an entire polishing process, semiconductor topography 154 may be transferred to a cleaning step with the residual slurry particles present on the topography. The cleaning step may include, for example, immersing the semiconductor topography in a solution designed to remove the residual slurry particles from the topography without abrading the particles against polished layer 156. Such a cleaning step may include, however, any post-CMP cleaning step known in the art. In this manner, topography 154 may be substantially free of residual slurry particles subsequent to a cleaning step as shown in FIG. 8.” (Underlining is added for emphasis)

Zagrebelyn further states at col. 14, lines 51-60:

“FIG. 8 illustrates another embodiment of polishing semiconductor topography 154 on a polishing pad. The polishing may include depositing water on a polishing pad in a plurality of dispense intervals during polishing of topography 15. In an embodiment, such polishing may be a final polishing step of a polishing process performed subsequent to a primary polishing step as described above. In such an embodiment, no additional polishing solution such as a slurry may be deposited on a final polishing pad during the final polishing step.” (Underlining is added for emphasis)

Zagrebelyn merely describes the final polishing step with residual slurry particles present on the topography. No additional polishing solution such as the slurry is deposited on the final polishing pad through a nozzle during the final polishing step of Zagrebelyn.

Hence, the noted feature, namely “in the further polishing the surface of the film-to-be-polished, said polishing slurry is supplied onto the polishing pad through a nozzle, and said water is supplied onto the polishing pad through another nozzle”, is a distinction over Zagrebelyn.

Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim. In view of the distinction of claims 1 and 3 noted above, at least one claimed element is not present in Zagrebelyn. Hence, Zagrebelyn does not anticipate claims 1 and 3.

Claims 12 and 28 ultimately depend from claim 1, respectively, and so at least similarly distinguish over Zagrebelyn. Hence, Zagrebelyn also does not anticipate claims 12 and 28.

INDEPENDENT CLAIM 2

As an example, independent claim 2 recites (among other things) a feature of “in the further polishing the surface of the film-to-be-polished, said mixture of said polishing slurry and said water is supplied onto the polishing pad through a nozzle” (Underlining is added for emphasis). As will be explained below, at least this feature of claim 2 is a distinction over Zagrebelyn.

The Office Action alleges that Zagrebelny teaches “a water content in mixture of polishing slurry and water of the final polishing step (col. 14, lines 33-50) is higher than a water content in polishing slurry of the primary polishing step (primary polishing step without water; col. 11, lines 62-67 and Abstract).

Zagrebelny states at col. 11, lines 62-67:

“A primary polishing step may include, for example, three phases. Each of the three phases may include depositing a polishing solution upon the polishing pad at a flowrate of approximately 150 ml/min to approximately 250 ml/min. Each of the three phases, however, may not include depositing water on the polishing pad.” (Underlining is added for emphasis)

Zagrebelny states at Abstract:

“A method is provided for processing a semiconductor topography. In an embodiment, the method includes polishing the topography on a primary polishing pad during a primary polishing step without depositing water on the primary polishing pad. The method may also include transferring the topography from the primary polishing pad to a final polishing pad. A substantial amount of residual slurry particles may be present on the topography while the topography is being transferred. In an embodiment, the method may also include polishing the topography on a final polishing pad during a final polishing step. The final polishing step may include depositing water on the final polishing pad in a plurality of dispense intervals to reduce a rate of change of a pH of a polishing solution on the topography. (Underlining is added for emphasis)

Zagrebelny merely describes the final polishing step with residual slurry particles present on the topography. No mixture of the slurry and water is deposited on the final polishing pad through a nozzle during the final polishing step of Zagrebelny.

Hence, the noted feature, namely “in the further polishing the surface of the film-to-be-polished, said mixture of said polishing slurry and said water is supplied onto the polishing pad through a nozzle”, is a distinction over Zagrebelny.

By failing to show each and every element of claim 2 as arranged in the claim, Zagrebelny fails to anticipate claim 2. Claims 13 and 29 ultimately depend from claim 2, respectively, and so at least similarly distinguish over Zagrebelny.

In view of the foregoing discussion, the rejection of claims 1-3, 12, 13, 28 and 29 is improper. Accordingly, withdrawal of the rejection is respectfully requested.

Claim Rejections Under 35 U.S.C. §103

Claims 4 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over by the Zagrebelny.

INDEPENDENT CLAIM 4

As an example, independent claim 4 recites (among other things) a feature of “in the further polishing the surface of the film-to-be-polished, said polishing slurry is supplied onto the polishing pad through a nozzle, and said water is supplied onto the polishing pad through another nozzle” (Underlining is added for emphasis). As will be explained below, at least this feature of claim 4 is a distinction over Zagrebelny.

The Office Action alleges that Zagrebelny teaches “further polishing the surface of the film-to-be-polished with the polishing pad while polishing slurry and water are supplied onto the polishing pad (final polishing step with residual slurry particles 158 present on surface 156; fig. 7 and col. 14, lines 33-50).”

Zagrebelny states at col. 14, lines 33-50:

“In an embodiment, if the polishing described above is a primary polishing step, semiconductor topography 154 may be transferred to a final polishing step with residual slurry particles 158 present on the topography. As such, a pH transition does not take place on the primary polishing pad during the primary polishing step. In an alternative embodiment, if the polishing described above is substantially an entire polishing process, semiconductor topography 154 may be transferred to a cleaning step with the residual slurry particles present on the topography. The cleaning step may include, for example, immersing the semiconductor topography in a solution designed to remove the residual slurry particles from the topography without abrading the particles against polished layer 156. Such a cleaning step may include, however, any post-CMP cleaning step known in the art. In this manner, topography 154 may be substantially free of residual slurry particles subsequent to a cleaning step as shown in FIG. 8.” (Underlining is added for emphasis)

Zagrebelny further states at col. 14, lines 51-60:

“FIG. 8 illustrates another embodiment of polishing semiconductor topography 154 on a polishing pad. The polishing may include depositing water on a polishing pad in a plurality of dispense intervals during polishing of topography 15. In an embodiment, such polishing may be a final polishing step of a polishing process performed subsequent to a primary polishing step as described above. In such an embodiment, no additional polishing solution such as a slurry may be deposited on a final polishing pad during the final polishing step.” (Underlining is added for emphasis)

Zagrebelyn merely describes the final polishing step with residual slurry particles present on the topography. No additional polishing solution such as the slurry is deposited on the final polishing pad through a nozzle during the final polishing step of Zagrebelyn.

Hence, the noted feature of claim 4, namely “in the further polishing the surface of the film-to-be-polished, said polishing slurry is supplied onto the polishing pad through a nozzle, and said water is supplied onto the polishing pad through another nozzle”, is a distinction over Zagrebelyn.

Among other things, a *prima facie* case of obviousness must establish that the reference teaches or suggests each and every element of the claimed invention. In view of the distinction of claim 4 noted above, at least one claimed element is not present in the reference. Hence, the Office Action fails to establish a *prima facie* case of obviousness vis-à-vis claim 4. Claim 34 ultimately depend from claim 4, and so at least similarly distinguish over the reference.

In view of the foregoing discussion, the rejection of claims 4 and 34 is improper. Accordingly, withdrawal of the rejection is respectfully requested.

New Claims

Again, new claims 35 and 36 have been added. Distinguishing features of claims 1-4 have been noted above. As for new claims 35 and 36 not argued above, the following comments are provided.

New claim 35 ultimately depend from claim 1, new claim 36 ultimately depend from claim 2, and so at least similarly distinguish over the reference.

Conclusion

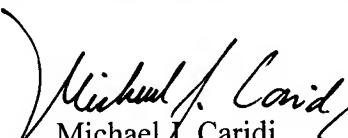
In light of the foregoing, withdrawal of the rejections of record and allowance of this application are earnestly solicited.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP


Michael J. Caridi
Attorney for Applicants
Registration No. 56,171
Telephone: (202) 822-1100
Facsimile: (202) 822-1111

MJC/ttw